CASE REPORT

Robotic-Assisted Repair of Iatrogenic Ureteral Ligation Following Robotic-Assisted Hysterectomy

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ABSTRACT

Background and Objectives: Ureteral injuries, while rare, do occur during gynecologic procedures. The expansion of laparoscopic and robotic pelvic surgical procedures increases the risk of ureteral injury from these procedures and suggests a role for minimally invasive approaches to the delayed repair of ureteral injuries. We present, to our knowledge, the first case of delayed robotic-assisted ureteral deligation and ureterolysis following iatrogenic ureteral injury occurring during a robotic abdominal hysterectomy.

Methods: We present a case report and review of the literature.

Results: A 57-year-old female underwent a seemingly uncomplicated robotic-assisted laparoscopic total abdominal hysterectomy and bilateral oophorectomy for symptomatic fibroids. On postoperative day 8, she presented with persistent right flank pain. Imaging studies revealed high-grade ureteral obstruction consistent with suture ligation of the right ureter. She underwent successful robotic-assisted ureteral deligation and ureterolysis. Her postoperative course was unremarkable, and she was discharged home on postoperative day 1 from the deligation.

Conclusion: Robotic-assisted management of complications from urologic or gynecologic surgery is technically feasible. This can potentially preserve the advantages to the patient that are being seen from the initial less-invasive surgery.

Key Words: Robotics, Ureter, Gynecologic surgical procedure.

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INTRODUCTION

Although rare, iatrogenic urologic complications during gynecologic procedures do occur. The position of the ureter, approximately 2.3 cm from the lateral edge of the cervix, makes it particularly vulnerable to injury or ligation. The reported incidence of ureteral injuries during laparoscopic hysterectomy ranges from 0.4% to 2.5%.[1–4] Ideally, ureteral injuries are identified and managed at the time of injury. Unfortunately, many injuries are not recognized intraoperatively, necessitating delayed surgery.[1–4] In the delayed setting, there is often significant scarring, and traditionally these injuries have been repaired through a standard open surgical approach. However, the expansion of laparoscopic and robotic pelvic surgery suggests a role for minimally invasive approaches to the delayed repair of ureteral injuries. We present, to our knowledge, the first case of delayed robotic-assisted ureteral deligation and ureterolysis following iatrogenic ureteral injury occurring during a robotic abdominal hysterectomy.

CASE REPORT

A 57-year-old female underwent a seemingly uncomplicated robotic-assisted total hysterectomy and bilateral oophorectomy for symptomatic fibroids. On postoperative day number 8, she presented for her postoperative follow-up appointment with a complaint of persistent low back discomfort and right flank pain. The same day, a CT scan with IV contrast was obtained that demonstrated severe right-sided hydroureteronephrosis consistent with a high-grade obstruction **(Figure 1)**. She was admitted, and the following day (postoperative day 9), she was taken back to the operating room for further evaluation and management. A retrograde uretero-pyelogram demonstrated an abrupt cutoff of the right distal ureter consistent with suture ligation **(Figure 2)**. A ureteral stent was successfully placed, but the ureter remained severely medially deviated, and it was elected to definitively relieve the obstruction. The patient was explored, and the ureteral obstruction repaired via a less-invasive approach using robotic assistance.

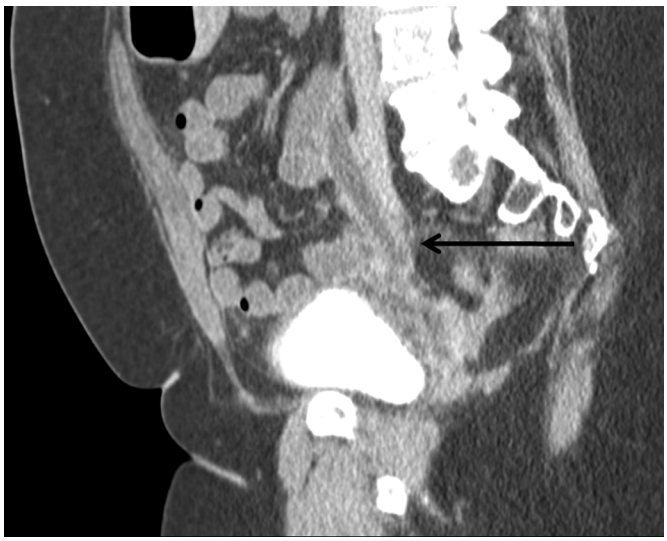

Figure 1. CT with IV contrast showing severe right-sided hydroureteronephrosis consistent with a high-grade obstruction.

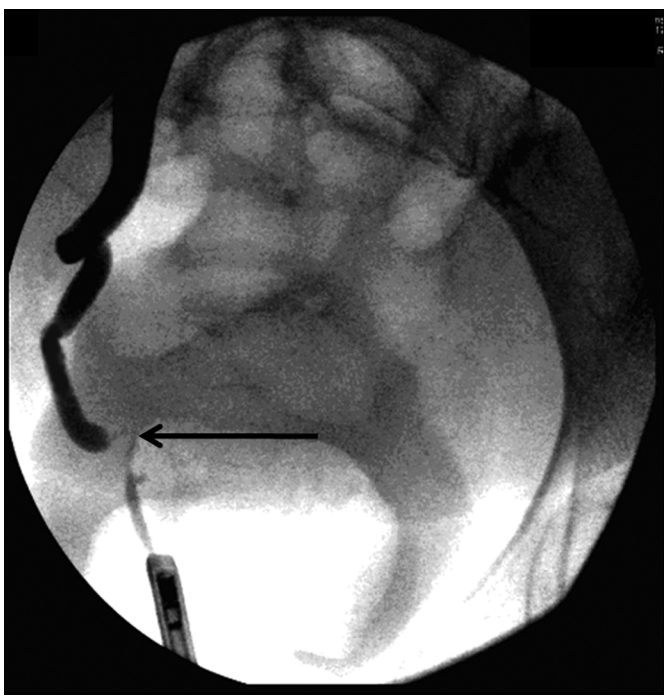

Figure 2. Retrograde uretero-pyelogram demonstrating an abrupt cutoff of the right distal ureter consistent with suture ligation.

Description of Robotic Surgical Procedure

The patient was repositioned in a steep Trendelenburg position with legs on spreader bars. A 4-port format was used with a 12-mm supraumbilical camera port, two 8-mm robotic ports each placed lateral to the medial umbilical ligaments and 19cm from the pubic symphysis, and a 12-mm right lower quadrant assistant port. These ports were all placed through her previous incisions. There were mild adhesions present that were released sharply. The right ureter was identified as it crossed over the iliac vessels. A Penrose drain was placed encircling the ureter, and the ureter was dissected sharply towards the bladder. During this dissection, it became apparent that the right ureter had been incorporated into the running suture used to close the vaginal cuff. The suture was cut and the vaginal closure taken down in its entirety. After releasing the suture, the ureter appeared healthy but encased in inflammatory tissue that was excised. The vaginal cuff was re-closed with a running 3–0 Vicryl secured with LapraTy Clips (Ethicon, Cincinnati, OH). The ports were removed and skin incisions re-closed. Total robotic operative time was 47 minutes. The patient was discharged home on postoperative day 1. Her ureteral stent was removed 3 weeks later. A follow-up Lasix renal scan 3-months postoperatively demonstrated normal renal function bilaterally without evidence of obstruction.

DISCUSSION

In females, the ureter courses medially at the base of the broad ligament, traversing just below the uterine vessels and then enters the bladder posterolaterally approximately 2.3cm from the lateral edge of the cervix. This location is the most common site of iatrogenic ureteral injury during gynecologic procedures. Half of all ureteral injuries involve suture ligation, and the majority of ureteral injuries are not identified intraoperatively.[4] The typical management of iatrogenic obstruction of the ureter that is recognized postoperatively involves initial stenting followed by delayed open ureterolysis, repair, ureteral reimplantation, or both.[1]

The role of robotic hysterectomy has been expanding rapidly, and iatrogenic ureteral ligation during robotic and laparoscopic gynecologic surgery has been reported.[4] Because these complications are rarely found intraoperatively, there is usually great reluctance on the part of the surgeon or patient, or both, to manage these complications robotically. Despite this, there is a potential role for robotic surgery in the delayed management of iatrogenic ureteral obstruction. As the role of robotic-assisted surgery continues to expand, complications from minimally invasive urologic and gynecologic surgery can now be managed robotically as well. Recent reports have shown that with robotic-assisted techniques, it is feasible to perform

upper and lower urinary tract reconstruction with such procedures as ureteral reimplantation and ureteroureterostomy.[5,6] It is logical that these same techniques can be used for the management of ureteral complications. Our experience supports a role for robotic repair of iatrogenic ureteral obstruction due to suture ligation. This role can potentially be expanded to include the repair of other iatrogenic ureteral injuries.

CONCLUSION

Robotic-assisted management of complications from urologic or gynecologic surgery is technically feasible. This can potentially preserve the advantages to the patient of the initial minimally invasive surgery.

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